APPENDIX H:

HEALTH RISK ASSESSMENT FOR AIR TOXICS

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This document presents the methodology and results of a health risk assessment (HRA) performed to assess potential public exposure and impacts associated with emissions of hazardous air pollutants (HAPs) and ammonia from the operation of the Termoeléctrica de Mexicali (TDM) and La Rosita Power Complex (LRPC) power plants. This document provides an overview of the methods used in the HRA, the assumptions used in calculating HAP emission rates, and a summary of the potential risks for the various alternatives described in Chapter 2 of this EIS.

H.1 PROJECT BACKGROUND

This HRA analyzes the potential risks in the United States that may result from operations of the LRPC and TDM power plants as described in Chapter 2. This HRA contains a review of the health risks associated with the no action and proposed action alternatives, as described below.

H.1.1 No Action

Under the no action alternative, no additional transmission lines would be built. Therefore, there would be no health risk impacts in the United States linked to operation of the additional lines. For the purposes of this analysis, it was assumed that the TDM plant, which would use the proposed transmission lines and would have no other outlet for power, would no longer operate or produce emissions. Therefore, the risks in the United States attributed to the TDM plant would be zero.

It was further assumed that the two export turbines at the LRPC power plant would no longer be able to export power to the United States over the proposed transmission lines. The Energiá de Baja California (EBC) unit would not operate and would produce no emissions. However, electrical output of the Energiá Azteca X, S. de R.L. de C.V. (EAX) export turbine would be integrated with the Comisíon Federal de Electricidad (CFE) system and would export power to the United States over the existing Imperial Valley (IV)-La Rosita line. Therefore, impacts in the United States would occur as a result of operation of the EAX export turbine. Operation of and impacts from the two EAX Mexico gas turbines would also occur and are included in the no action alternative, for a total of three turbines at the LRPC.

H.1.2 Proposed Action

Under this alternative, Presidential permits would be granted by the U.S. Department of Energy (DOE), and corresponding right-of-ways (ROWs) would be granted by the

U.S. Department of the Interior, Bureau of Land Management (BLM); the additional transmission lines would be constructed; and the TDM power plant and the export turbines at the LRPC power plant would operate. Operation of the two EAX Mexico turbines would also occur; therefore, the proposed action contains an analysis of all six turbines at the TDM and LRPC power plants. Because the proposed action in the air impacts analysis presented in Section 4.3 includes TDM and only the two LRPC export units, the results obtained in this HRA are more conservative and are comparable to the cumulative impacts discussed in Section 4.3.

H.2 HEALTH RISK ASSESSMENT PROCEDURES

The methods used to assess potential human health risks due to emissions of HAPs followed the California Office of Environmental Health Hazard Assessment (OEHHA) risk assessment guidelines (OEHHA 2003), as supplemented by the California Air Resources Board (ARB 2003) interim guidance for residential inhalation exposure. In this document, these guidelines are referred to as the “HRA Guidelines.” A Tier 1 point estimate HRA, as described in these guidelines, was performed for the projects.

The HRA was conducted in three steps. First, emissions of HAPs, plus ammonia, from the no action and proposed action alternatives were estimated. Second, exposure calculations were performed by using the same dispersion model as that used for the air quality assessment described in Section 4.3.2. Third, results of the exposure calculations, along with the respective cancer potency factors and chronic and acute noncancer reference exposure levels (RELs) for each toxic substance, were used to perform the risk characterization to quantify individual health risks associated with predicted levels of exposure.

Since a portion of the toxics potentially emitted by the TDM and LRPC power plants are considered multipathway air toxics, a multipathway risk analysis was performed. The multipathway analysis evaluated the following routes of exposure: inhalation, soil ingestion, dermal absorption, mother’s milk ingestion, and plant product ingestion. Inhalation and ingestion of contaminated plant products would be the dominant pathways for public exposure to chemical substances released by the TDM and LRPC power plants.

H.2.1 Emissions Characterization

The TDM and LRPC power plant operations were evaluated to determine if HAPs would cause adverse health effects when released to the atmosphere. The HAPs evaluated in this HRA were identified from available emission factors obtained from the U.S. Environmental Protection Agency (EPA) AP-42 emission factor database (AP-42, Table 3.1-3, Natural Gas-Fired Stationary Gas Turbines, April 2000); the risk values were obtained from OEHHA. In addition to AP-42 emission factors, emission rates from ammonia slip were also included. To estimate emission rates, 8,760 hours per year of operations were assumed for all HAPs from the turbines and duct burners.

To calculate emissions by using AP-42 emission factors, the maximum potential combined fuel heat input rates for the turbines and duct burners were used for each facility. The maximum potential fuel rate for the TDM facility is 38,400,000 million British thermal units per year (MMBtu/yr), while the maximum potential fuel rate for the LRPC power plant is 68,500,000 MMBtu/yr. Since the fuel rates are provided for all combined turbine/duct burner pairs at each facility, it was assumed that all of the natural gas would be burned in the turbines.

The TDM power plant emissions are controlled with oxidation catalysts, and a control efficiency of 50% was assumed for all HAPs. This control efficiency is a reasonable average level of control for organic HAPs from natural-gas-fired combustion turbines equipped with oxidation catalysts. The actual control efficiency will vary for each compound, although the EPA has determined a control efficiency of 85 to 90% for formaldehyde, which is the predominant HAP emitted by the gas-fired combustion turbines (EPA 2002). The LRPC turbines do not have oxidation catalysts; therefore, no control was assumed for the LRPC emissions.

To estimate the potential emissions of ammonia due to ammonia slip from the selective catalytic reduction (SCR) systems, the total annual ammonia emissions from each facility were assumed. This total included the projected installation of SCR on all turbines at the LRPC by March 2005. The TDM power plant has been equipped with SCR since its inception.

To estimate hourly emission rates, the annual fuel input rates for each facility were divided by 8,760 hours per year. The plantwide natural gas fuel input rate was divided equally among the number of turbines to obtain modeled emission rates for a single turbine at each facility. Table H-1 presents the emission calculations for a single turbine at the TDM plant. Table H-2 presents the emission calculations for a single turbine at the LRPC plant.

H.2.2 Risk Assessment Dispersion Modeling Methodology

The exposure assessment portion of the HRA was conducted by using the proposed EPA guideline model AERMOD (AMS/EPA Regulatory MODel) Version 02222. Modeled stack parameters for the turbines represent 100% load conditions, consistent with the criteria pollutant modeling discussed in Section 4.3.2. Modeled stack parameters for all sources are provided in Table H-3.

Direction-specific downwash parameters were included for each stack, which were calculated by using the EPA-approved Building Profile Input Program (Version 95086), as adapted to accommodate the Plume Rise Model Enhancements (PRIME) algorithms currently employed by AERMOD Version 02222. The modeled receptors were consistent with the criteria pollutant modeling performed in Section 4.3.2 and included receptors along the U.S.-Mexico border and a Cartesian grid inside the United States.

The same 5 years of meteorological data (1993–1995, 1998, and 1999) from the Imperial and Miramar Naval Air Stations were used, as discussed in the criteria pollutant modeling in Section 4.3.2. To determine the worst-case year for annual impacts (cancer risk and

TABLE H-1 Ammonia and HAP Emission Rates at the TDM Power Plant[a]

Pollutant	AP-42 Emission Factor[b] (lb/MMBtu)	Total Annual Emission Rate[c] (tons/yr)	Single Turbine Hourly Rate[d] (g/s)	Single Turbine Annual Rate[d] (g/s)
Acetaldehyde	4.00×10^{-5}	0.38	5.52×10^{-3}	5.52×10^{-3}
Acrolein	6.40×10^{-6}	0.06	8.84×10^{-4}	8.84×10^{-4}
Ammonia[e]	NA[f]	276.00	3.97	3.97
Benzene	1.20×10^{-5}	0.12	1.66×10^{-3}	1.66×10^{-3}
1,3-Butadiene	4.30×10^{-7}	0.00	5.94×10^{-5}	5.94×10^{-5}
Formaldehyde	7.10×10^{-4}	6.82	9.80×10^{-2}	9.80×10^{-2}
Naphthalene	1.30×10^{-6}	0.01	1.80×10^{-4}	1.80×10^{-4}
Propylene oxide	2.90×10^{-5}	0.28	4.00×10^{-3}	4.00×10^{-3}
Toluene	1.30×10^{-4}	1.25	1.80×10^{-2}	1.80×10^{-2}
Xylene (total)	6.40×10^{-5}	0.61	8.84×10^{-3}	8.84×10^{-3}
Ethylbenzene	3.20×10^{-5}	0.31	4.42×10^{-3}	4.42×10^{-3}
PAHs[g]	2.20×10^{-6}	0.02	3.04×10^{-4}	3.04×10^{-4}
Total HAPs (excludes ammonia)		9.9 tons/yr		

[a] HAP emissions assume 50% control from oxidation catalyst.

[b] Source: AP-42, Table 3.1-3, Natural Gas-Fired Stationary Gas Turbines (April 2000).

[c] Maximum fuel input = 38,400,000 MMBtu/yr for two turbines (19,200,000 MMBtu/yr per turbine).

[d] Modeled emissions rates calculated from ton/yr rates assuming 8,760 h/yr operation.

[e] Ammonia emission rates obtained from Table 4.3-1a (p. 4-40 of the EIS).

[f] NA = not applicable.

[g] PAHs = polycyclic aromatic hydrocarbons.

noncarcinogenic chronic hazard index) and peak hourly impacts (acute hazard index), all stacks were modeled with a unit emission rate of 1 gram per second (g/s). Because of the relatively large distance to the nearest receptors along the U.S.-Mexico border (approximately 4 mi [6 km]), the peak impacts due to each individual stack did not vary by more than 6% for each of the 5 years.

The worst-case year for peak hourly impacts for all stacks was 1998, and the worst-case year for annual impacts for all stacks was 1995. Thus, the 1998 meteorological data were used to estimate the acute hazard indices, and the 1995 meteorological year was used to estimate the cancer risks and noncarcinogenic chronic hazard indices. The worst-case single stack impact for each facility was conservatively assumed to represent the impact from all turbines for each facility.

TABLE H-2 Ammonia and HAP Emission Rates at the LRPC Power Plant[a]

Pollutant	AP-42 Emission Factor[b] (lb/MMBtu)	Total Annual Emission Rate[c] (ton/yr)	Single Turbine Hourly Rate[d] (g/s)	Single Turbine Annual Rate[d] (g/s)
Acetaldehyde	4.00×10^{-5}	1.37	9.85×10^{-3}	9.85×10^{-3}
Acrolein	6.40×10^{-6}	0.22	1.58×10^{-3}	1.58×10^{-3}
Ammonia[e]	NA[f]	370.00	2.66	2.66
Benzene	1.20×10^{-5}	0.41	2.96×10^{-3}	2.96×10^{-3}
1,3-Butadiene	4.30×10^{-7}	0.01	1.06×10^{-4}	1.06×10^{-4}
Formaldehyde	7.10×10^{-4}	24.32	1.75×10^{-1}	1.75×10^{-1}
Naphthalene	1.30×10^{-6}	0.04	3.20×10^{-4}	3.20×10^{-4}
Propylene oxide	2.90×10^{-5}	0.99	7.14×10^{-3}	7.14×10^{-3}
Toluene	1.30×10^{-4}	4.45	3.20×10^{-2}	3.20×10^{-2}
Xylene (total)	6.40×10^{-5}	2.19	1.58×10^{-2}	1.58×10^{-2}
Ethylbenzene	3.20×10^{-5}	1.10	7.88×10^{-3}	7.88×10^{-3}
PAHs[g]	2.20×10^{-6}	0.08	5.42×10^{-4}	5.42×10^{-4}
Total HAPs (excludes ammonia)		35.2 tons/yr		

[a] Assumes no control of HAP emissions.

[b] Source: AP-42, Table 3.1-3, Natural Gas-Fired Stationary Gas Turbines (April 2000).

[c] Maximum fuel input = 68,5400,000 MMBtu/yr for four turbines (17,125,000 MMBtu/yr per turbine).

[d] Modeled emissions rates calculated from ton/yr rates assuming 8,760 h/yr operation.

[e] Ammonia emission rates obtained from Table 4.3-1a (p. 4-4 of the EIS).

[f] NA = not applicable.

[g] PAH = polycyclic aromatic hydrocarbons.

H.2.3 Risk Characterization

Carcinogenic risks (defined as a 70-year residential exposure) and potential chronic and acute health effects were assessed by using the dispersion modeling described above (OEHHA exposure assumptions and numerical values of toxicity provided in the HRA Guidelines). The environmental pathways analyzed consisted of all pathways recommended in the HRA Guidelines as appropriate for the impact area in the United States.

As specified in the HRA Guidelines, a Tier 1 HRA utilizes a combination of the average and high-end point estimates to estimate exposure. The average and high-end point estimates are defined in the HRA Guidelines in terms of a probability distribution of values for the given exposure variant. The mean represents the average values for point estimates, and the 95th percentiles represent the high-end point estimates from the distributions identified in OEHHA (2000).

TABLE H-3 Modeled Stack Parameters

Model ID[a]	UTM X (m)	UTM Y (m)	Height (m)	Temp. (K)	Exit Velocity (m/s)	Diameter (m)
SESTK1	625477	3607809	60.0	358.2	18.05	5.79
SESTK2	625477	3607765	60.0	358.2	18.05	5.79
LRSTK1	628531	3607621	56.0	349.8	21.00	5.49
LRSTK2	628571	3607608	56.0	349.8	21.00	5.49
LRSTK3	628610	3607596	56.0	349.8	21.00	5.49
EPSTK1	628791	3607880	56.0	349.8	21.00	5.49

[a] SESTK1 and SESTK2 are the two TDM turbines. LRSTK1-3 and EPSTK1 are the four LRPC turbines.

This HRA followed the most current requirements adopted by the State of California for conducting risk assessments, including use of the Hot Spots Analysis and Reporting Program (HARP) model. The HARP model (Version 1.0) is the only readily available software that conforms to the HRA Guidelines and is capable of performing both the average and high-end risk calculations. For the purposes of this HRA, the average point estimate inhalation and multipathway risks are defined as provided in the HRA Guidelines. The high-end point estimate risks are defined as a combination of the high-end exposure assumptions for multipathway toxics combined with the ARB Interim HRA Guidelines exposure assumptions for the inhalation pathway, which uses the 80th percentile breathing rate rather than the 95th percentile breathing rate (ARB 2003).

To calculate the risks for a single turbine at each plant, the HARP model[1] used the worst-case ground level concentrations (GLCs) of each pollutant by using a two-step process as described below. The GLCs were calculated by using the worst-case single-turbine impact from each plant and the emission rates provided in Tables H-1 and H-2. Table H-4 provides the GLCs for a single TDM turbine and a single LRPC turbine. This GLC risk assessment method uses the latest dispersion techniques available from AERMOD, coupled with the current risk assessment guidelines required by OEHHA. It also provides consistency with the dispersion modeling approach used to assess impacts to air quality as described in Section 4.3.

[1] The HARP model has a significant limitation in that the EPA Industrial Source Complex Short-Term (ISCST3) model is the built-in dispersion model for performing the exposure assessment. HARP does not allow for the use of other dispersion models, such as AERMOD, in the full dispersion exposure assessment. However, HARP does have the ability to accept externally calculated GLCs of individual pollutants, thereby bypassing the soon-to-be phased out ISCST3 model, with impacts calculated by using AERMOD. This method of using GLCs calculated by AERMOD provides the ability to determine a conservative impact for each facility, since the single-turbine peak impacts are simply multiplied by the number of turbines for each alternative.

TABLE H-4 Maximum Ground Level Concentrations for a Single Turbine at the TDM and LRPC Power Plants

	Maximum TDM Ground Level Concentration ($\mu g/m^3$)		Maximum LRPC Ground Level Concentration ($\mu g/m^3$)	
Pollutant	1-Hour[a]	Annual[b]	1-Hour[c]	Annual[d]
Acetaldehyde	2.71×10^{-3}	2.92×10^{-5}	4.92×10^{-3}	5.50×10^{-5}
Acrolein	4.34×10^{-4}	4.67×10^{-6}	7.88×10^{-4}	8.80×10^{-6}
Ammonia	1.95	2.10×10^{-2}	1.33	1.48×10^{-2}
Benzene	8.14×10^{-4}	8.75×10^{-6}	1.48×10^{-3}	1.65×10^{-5}
1,3-Butadiene	2.92×10^{-5}	3.14×10^{-7}	5.29×10^{-5}	5.91×10^{-7}
Formaldehyde	4.81×10^{-2}	5.18×10^{-4}	8.74×10^{-2}	9.76×10^{-4}
Naphthalene	8.81×10^{-5}	9.48×10^{-7}	1.60×10^{-4}	1.79×10^{-6}
Propylene oxide	1.97×10^{-3}	2.11×10^{-5}	3.57×10^{-3}	3.99×10^{-5}
Toluene	8.81×10^{-3}	9.48×10^{-5}	1.60×10^{-2}	1.79×10^{-4}
Xylene (total)	4.34×10^{-3}	4.67×10^{-5}	7.88×10^{-3}	8.80×10^{-5}
Ethylbenzene	2.17×10^{-3}	2.33×10^{-5}	3.94×10^{-3}	4.40×10^{-5}
PAHs	1.49×10^{-4}	1.60×10^{-6}	2.71×10^{-4}	3.02×10^{-6}

[a] Maximum TDM single turbine hourly impact: 0.49101 $\mu g/m^3$.

[b] Maximum TDM single turbine annual impact: 0.00528 $\mu g/m^3$.

[c] Maximum LRPC single turbine hourly impact: 0.49959 $\mu g/m^3$.

[d] Maximum LRPC single turbine annual impact: 0.00558 $\mu g/m^3$.

The risks from a single turbine at each facility were calculated first, prior to estimating the risks for each alternative, each of which consists of multiple turbines. The worst-case GLCs for a single turbine at each facility were input to the HARP model directly. The default OEHHA site parameters were used for the multipathway analysis for polycyclic aromatic hydrocarbon (PAH) emissions (note that total PAH emissions were conservatively modeled as benzo(a)pyrene). The average point estimate risks were calculated in a single HARP run for each plant. To calculate the high-end residential cancer risk, HARP was run twice for each plant as follows:

1. An inhalation-only cancer risk assessment analysis was run by using exposure assumptions consistent with the ARB interim guidance.

2. A multipathway cancer risk assessment analysis was run by using high-end point estimate residential exposure assumptions to obtain the multipathway component of the PAH risks.

For the high-end risk calculations, the total inhalation cancer risk under Step 1 was added to the multipathway contribution under Step 2 to obtain the high-end residential cancer risk for a single turbine at each plant. The chronic noncancer and acute hazard indices for a single turbine at each plant were obtained from the high-end point estimate HARP runs.

Any number of worst-case single turbine risk calculations can be summed to estimate the total risk for the given scenario. This approach is reasonable since the emission rates for each turbine at each plant are identical, and the peak impacts for each individual turbine vary by only a few percent. Adding the worst-case turbine risks to estimate total plant risk is a conservative assumption and provides a health-protective approach to estimating the project risks.

The chief cancer risk exposure assumption is one of continuous exposure (at maximum emission rates) over a 70-year period. The RELs are defined as the concentration below which there are no observable health risks. When combined with proposed EPA dispersion modeling methodologies, the use of the HRA Guidelines risk methods (via the HARP model that incorporates cancer potency factors and RELs) provides an upper bound estimate of the true risks. That is, the actual risks are not expected to be any higher than the predicted risks and are likely to be substantially lower.

H.3 RISK ASSESSMENT RESULTS

The estimated risks for each alternative are discussed in this section. As described in the EIS, the no action alternative consists of three turbines operating at the LRPC. The proposed action consists of four turbines at the LRPC plant and two turbines at the TDM plant, for a total of six turbines. For each alternative, it was assumed that the respective number of turbines would operate concurrently and continuously (i.e., 8,760 hours per year).

To estimate the risks for the no action alternative, the single LRPC turbine risks were multiplied by three to estimate the total risks. To estimate the proposed action risks due to LRPC operation, the single LRPC turbine risks were multiplied by four. To estimate the proposed action risks due to TDM operation, the single TDM turbine risks were multiplied by two. The risks from all TDM and LRPC turbines were summed to obtain the total proposed action risks.

The current methodology for making risk management decisions in California requires only that a project analyze the incremental increase in the potential risks due to the project and does not require that existing sources be included in the risk calculations. Risks from existing sources are considered “background” sources of emissions. Therefore, the no action risks estimated for the three existing LRPC turbines are considered background sources and are subtracted from the proposed action risks to obtain the incremental increase in risk. On the basis of California risk assessment procedures, only the incremental increase in potential risks is compared to the significance thresholds.

The incremental increases in risk for the no action and the proposed action alternatives are presented in Table H-5. Two-point estimate cancer risks are presented that represent the average and high-end exposure assumptions. The no action cancer risk ranges from 0.41 per million to 1.50 per million for the average and high-end exposure assumptions, respectively. The proposed action cancer risk ranges from 0.60 per million to 2.22 per million.

TABLE H-5 Estimated Risks for the No Action and Proposed Action Alternatives

	Cancer Risk (per million)		Chronic Hazard Index[a]	Acute Hazard Index[a]
Alternative	Average	High-End	High-End	High-End
No action (background)	0.41	1.50	0.002 (0.00022)	0.02 (0.0013)
Proposed action	0.60	2.22	0.003 (0.00051)	0.03 (0.0029)
Incremental increase	0.20	0.72	0.001 (0.00028)	0.01 (0.0016)
Significance threshold	1 per million		1.0	1.0

[a] Values in parentheses represent the contributions from ammonia to the hazard index.

For this assessment, significance criteria of an increase in cancer risk of 1 per million and an increase in the chronic and acute hazard indices of 1.0 were chosen. As shown in Table H-5, the incremental (proposed action minus no action) increase in cancer risk ranges from 0.20 per million to 0.72 per million. The average and high-end point estimate risks are below the significance threshold of 1 per million. The estimated chronic and acute hazard indices, which include contributions from ammonia, are well below the significance threshold of 1.0 for the hazard indices. As stated above, only the incremental increase in risks are the values compared with the significance thresholds, per the California risk assessment policy.

The results of the supplemental HRA are considered to be conservative, as the analysis includes the following aspects:

- The turbines were assumed to operate at a 100% capacity factor, that is, at 100% load for 8,760 hours per year.

- The AP-42 emission factors for HAPs and the health risk factors are considered conservative.

- The worst-case turbine impacts for each power plant were summed to obtain the total risks for each alternative.

- A 70-year, 24-hour-per-day residential exposure duration was assumed.

- An average control efficiency of 50% from the oxidation catalyst was assumed at TDM, but the EPA (2002) indicates that up to 90% control is achievable for formaldehyde when an oxidation catalyst is used.

- The high-end cancer risk exposure assumptions are extremely conservative, and the actual risks are likely substantially lower.

Although the high-end cancer risks for both alternatives exceed the significance level of 1 per million, it should be noted that the Tier 1 high-end point estimate approach defined by OEHHA provides the absolute upper bound of the potential risks. The HRA Guidelines provide options for refining the HRA (Tiers 2 through 4). These higher tiers include site-specific site parameters and a stochastic, or probabilistic, approach using exposure factor distributions for one or more variables in the model. Statistical methods are applied to assess the variance and stochastic risk estimates expressed as a range rather than as a single point estimate, as provided in this HRA. However, since only the incremental increase in risk is required for risk management decisions, the incremental increase in risks due to the proposed action does not pose a significant health risk.

For reference, the risks due to each individual facility are provided in Table H-6. The same risk calculation methodology used for the alternatives was used in this analysis (four turbines operating at LRPC and two turbines operating at TDM). The TDM risk is much lower due to the fact that there are only two turbines present at the TDM power plant compared with four at the LRPC power plant. In addition, the TDM turbines are controlled with oxidation catalysts, while the LRPC turbines do not have HAP controls.

TABLE H-6 Estimated Risks for Each Power Plant

	Cancer Risk (per million)			
Facility	Average	High-End	Chronic Hazard Index High-End[a]	Acute Hazard Index High-End[a]
LRPC (four turbines)	0.54	2.00	0.002 (0.00030)	0.02 (0.0017)
TDM (two turbines)	0.06	0.22	0.0007 (0.00021)	0.007 (0.0012)
Significance threshold	1 per million		1.0	1.0

[a] Values in parentheses represent the contributions from ammonia to the hazard index.

H.4 REFERENCES

ARB (California Air Resources Board), 2003, *Recommended Interim Risk Management Policy for Inhalation-Based Residential Cancer Risk,* Oct.

EPA (U.S. Environmental Protection Agency), 2002, "Hazardous Air Pollutant (HAP) Emission Control Technology for New Stationary Combustion Turbines," Memo from S. Roy to Docket A-95-51, April 3.

OEHHA (California Office of Environmental Health Hazard Assessment), 2000, *Air Toxics Hot Spots Program Risk Assessment Guidelines, Part IV, Technical Support Document for Exposure Assessment and Stochastic Analysis*, Oct.

OEHHA, 2003, *The Air Toxics "Hot Spots" Program Guidance Manual for Preparation of Health Risk Assessments,* Aug. 2003 (released to the public in Oct. 2003).